



DATE: July 20, 2012

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FROM: [Redacted], SERAS Project Engineer

THOUGH: [Redacted] SERAS Program Manager

SUBJECT: [Redacted] RESIDENCES WELL WATER TREATMENT SYSTEM EVALUATIONS - TRIP REPORT
DIMOCK RESIDENTIAL GROUNDWATER SITE, DIMOCK, PA
Work Assignment No.: SERAS-172

PURPOSE

The purpose of this Trip Report is to detail the actions, observations and results of activities performed by Lockheed Martin Scientific, Engineering, Response and Analytical Services (SERAS) personnel at the [Redacted] Residences, Dimock, Pennsylvania (PA). SERAS was tasked by the Environmental Protection Agency/Environmental Response Team (EPA/ERT) and EPA Region III to assist with the evaluation of the point-of-entry water treatment systems at the two [Redacted] residences that are impacted with elevated levels of manganese and iron as well as methane.

BACKGROUND

To be completed.

SITE ACTIVITIES, OBSERVATIONS AND FINDINGS

On Monday, July 2, 2012, [Redacted] a SERAS Project Engineer, travelled to the site. He met with Mr. Richard Rupert, Mr. Richard Fetzer and Ms. Kelly Chase of EPA Region 3 and Dave Bofinger of Kemron Environmental Services, Inc. at the command post in South Montrose, PA. In the afternoon, Mr. [Redacted] Mr. Rupert, Mr. Fetzer and Mr. Bofinger travelled to the [Redacted] residences in Dimock, PA. The following residences were visited:

CR644 - [Redacted] **Ex. 6 - Personal Privacy**

CR652 - A trailer home resided by [Redacted] [The home where the man was sleeping on the sofa].

Two personnel from [Redacted] were at the site to service the point-of-entry water treatment system equipment in both homes. The [Redacted] team was observed to perform the following maintenance work on each system, first at CR644 and then at CR652:

- Liquid-phase granular activated carbon (LGAC) canister was replaced. The fresh LGAC canister contained approximately 40 lbs of GAC.
- The 35-gallon chlorine feed tank (CFT) was temporarily taken off-line, cleaned out, put back on-line and filled up with approximately 35 gallons of chlorine solution (CS). The CS was made up of 7.1 gallons of Clorox (High Efficiency Bleach) (5 x 1.42 gal each jug) and 28 gallons of potable water [from the water buffalo or the potable water tank (PWT)]. The resulting composition of the CS was (1:4) or 1 part Clorox to 4 parts water.
- Rest of the plumbing of each system was checked and adjusted/repaired as needed.
- Both systems were turned on. At this point, water from the PWT (EPA supplied potable water) was allowed to run through the system to ensure all the plumbing and the system components including the chlorine feed pump were working. This concluded the system maintenance work.

On the morning of Tuesday, July 3, 2012, [Redacted] Mr. Rupert and Mr. Bofinger arrived at the [Redacted] residences.

At 0845, Mr. Bofinger shut off water supply from the PWT to CR644, and instead TURNED ON the HW08 well water to CR644. At CR644, the Kitchen Sink Faucet was turned ON. The water flowrate was measured at 1.43 gallons per minute (gpm) [1 gallon in 42 seconds]. At this flowrate, the residence time (RT) for the chlorinated water before it enters the LGAC is approximately 56

minutes [80 gallons / 1.43 gpm]. [NOTE: Both CR644 and CR652 water treatment systems have two (2) 40-gal chlorine contact tanks in parallel, providing a combined contact tank capacity of 80 gallons.].

At 0905, Mr Bofinger shut off water supply from the PWT to CR652, and instead TURNED ON the HW08 well water to CR652. At CR652, the Bathtub Faucet was turned ON. The initial flowrate was measured at about 3.96 gpm. The flow rate was turned down and set to 2 gpm [2 gal in 61 seconds]. At this flowrate, the residence time (RT) for the chlorinated water before it enters the LGAC is approximately 40 minutes [80 gallons / 2 gpm].

Water temperature checks:
At 0930, water temperature at HW08 well head was 52°F.
At 0935, water temperature at the PWT outlet was 69.5°F.

Methane (CH4) Monitoring with TVA 1000.

At 1000, background CH4 level in the air around CR644 and CR652 was between 2 and 3 ppm_v, and ambient temperature was about 82°F.

At 1010, well water from HW08 was allowed to run through the attached garden hose for a couple of minutes to thoroughly purge the hose and for the hose discharge water temperature to get close to the well head temperature.

At 1015, a 1-gallon narrow-mouth plastic jug was filled with the HW08 well water. Temperature of the water was measured. Then, one half of the jug was emptied and a cap was immediately placed on the jug. Through a small hole (approximately 0.25 inch diameter) in the cap, the TVA 1000 probe was inserted into the head space of the jug to check for the CH4 level. Soon after, the contents of the jug were vigorously shaken, and the head space of the jug was screened for the CH4 level. Readings are as follows:

At HW08 Well Head

Time	Temp (°F)	CH4 (ppmv or %) using TVA 1000	CH4 (ppmv or %) using GEM 2000	Comments
1015	56	4% (peak)		Unshaken
1018	56	1.5% (peak)		Shaken
1137	51	1400 ppmv (peak)	0.1%	Unshaken
138	51	8.8% (peak)	4.9%	Shaken

At CR644, By-Pass/Pre-LGAC Sample Tap (i.e., down-stream of chlorine contact tank and upstream of the LGAC/de-chlorination vessel.

Time	Temp (°F)	CH4 (ppmv or %) using TVA 1000	CH4 (ppmv or %) using GEM 2000	Comments
1016	56	400 ppmv		Shaken
1023	56	1300 ppmv (peak)		Unshaken
1024	56	1.3% (peak)		Shaken
				15 minutes after water was shutoff at the CR644 Kitchen Sink Faucet.
1307	57	764 ppmv (peak)	0.1% (peak)	Unshaken
1308	57	2.1% (peak)	3.1% (peak)	Shaken

At CR644, Kitchen Sink Faucet.

Time	Temp (°F)	CH4 (ppmv or %) using TVA 1000	CH4 (ppmv or %) using GEM 2000	Comments
1021	58	31 ppmv (peak)		Unshaken
1022	58	1800 ppmv (peak)		Shaken
1055	57	300 ppmv (peak)		Unshaken
1056	57	2900 ppmv (peak)		Shaken
				After Tech Law sampling
1242	58	1480 ppmv (peak)	0.0%	Unshaken
1243	58	2.72% (peak)	2.7% (peak)	Shaken

At CR652, Bathtub Faucet.

Time	Temp	CH4 (ppmv or %)	CH4 (ppmv or %)	Comments
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	(°F)	using TVA 1000	using GEM 2000	
				After Tech Law sampling
1214	51	2600 ppmv (peak)	0.0%	Unshaken
1215	51	1.92% (peak)	1.3% (peak)	Shaken

Visual Evidence of Treatment Effect of Chlorination.

At around 1030, Mr. Rupert collected water samples from two locations in the CR644 trailer: 1) at the By-Pass/Pre-GAC sample tap, and 2) at the Kitchen Sink Faucet, in 1-gallon narrow-mouth plastic jugs. Both jugs were immediately capped and set out in the sun for visual observation.

Within a few minutes, the chlorine treated but Pre-GAC water sample started to turn brownish – suggesting that the application of chlorine was indeed facilitating the oxidation of metals such as Fe and Mn, resulting in their subsequent precipitation. On the other hand, even after several hours, the post-GAC water sample (i.e.; water that was subjected to chlorination and then de-chlorination/filtration via LGAC) remained completely clear – suggesting: 1) the precipitated contaminants were successfully filtered, and 2) oxidation reactions resulting in the precipitation of metals had ceased. The later finding is also supported through the observation of no chlorine smell in the Post-GAC or fully treated water. Whereas, the Pre-GAC water sample exhibited the smell of residual chlorine.

Dosing of Chlorine (Clorox) Solution.

The chlorine solution feed tanks for both the CR644 and CR652 treatment systems are 35-gallon plastic vessels, 18 inches in diameter and 32 inches tall. Therefore, each vertical inch of tank volume equals 1.1 gallon or 4,180 millileters (ml).

On the morning of July 3, 2012, the chlorine dosing rates for both the CR644 and CR652 treatment systems were noted as follows. A piece of duct tape was placed on the outside of each chlorine feed tank to mark the initial volume of chlorine solution. Time of the placement of the tape was noted. After several hours, both tanks were visited to note the level in the tanks. The observations were as follows:

At the CR644, the level in the tank had dropped by approximately 0.75 inch over a period of 183 minutes (start time 0921 and end time 1224). This amounts to a chlorine dosing rate of 12 ml per gallon of water processed through the CR644 system [(4,180 ml per inch x 0.75 inch) / 183 min / 1.43 gpm].

At the CR652, the level in the tank had dropped by approximately 0.5 inch over a period of 252 minutes (start time 0930 and end time 1330). This amounts to a chlorine dosing rate of 4.14 ml per gallon of water processed through the CR652 system [(4,180 ml per inch x 0.5 inch) / 252 min / 2 gpm].

CONCLUSIONS

Yet to be completed.